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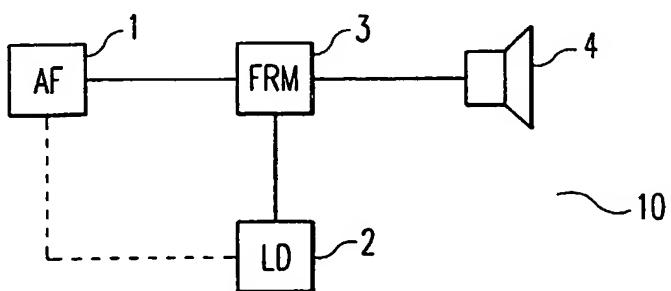
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SIGNAL STRENGTH INFORMATION DEPENDENT CONTROL OF SMALL ELECTRODYNAMIC TRANSDUCERS IN AUDIO SYSTEMS



(57) Abstract: A control circuit for a signal strength information dependant frequency response adaptation of an audio signal for an electrodynamic transducer (4), with a signal strength information determination means (2, 6) for determining a signal strength information according to the level of the audio signal, and a modifying means (3) for frequency selectively modifying the audio signal in response to the signal strength information such, that the electrodynamic transducer (4) converts the audio signal into a low distortion sound signal for high levels of an audio signal and with a flat frequency response for low levels of an audio signal, whereby

a lower frequency range of the audio signal is modified with a gain different to a gain of a higher frequency range of the audio signal and a frequency separating the lower frequency range from the higher frequency range is shifted towards higher values for an increasing level of the audio signal and towards lower values for a decreasing level of the audio signal. The present invention further proposes a mobile telecommunication terminal with an accordingly designed control circuit.

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INTERNATIONAL SEARCH REPORT

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PCT/EP 03/05648

A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04R H04M H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 315 378 A (NIPPON ELECTRIC CO) 28 January 1998 (1998-01-28) claim 1 figures 3,4 ----	1,14
A	US 4 837 832 A (FANSHEL SOL) 6 June 1989 (1989-06-06) abstract column 2, line 21 - line 61 ----	1,14
A	US 5 029 238 A (GEHR MARVIN M) 2 July 1991 (1991-07-02) column 1, line 37 - line 63 -----	1,14

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
GB 2315378	A	28-01-1998	JP	2880955 B2		12-04-1999
			JP	10028087 A		27-01-1998
			AU	738036 B2		06-09-2001
			AU	2856297 A		22-01-1998
			GB	2356305 A ,B		16-05-2001
			US	5933769 A		03-08-1999
US 4837832	A	06-06-1989		NONE		
US 5029238	A	02-07-1991		NONE		